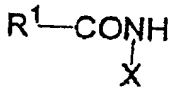
WHAT IS CLAIMED IS:

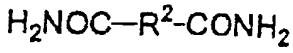
1. A heat-sensitive recording material comprising:

(a) a support; and

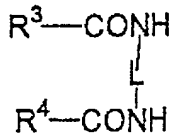
(b) a plurality of layers formed on the support, including at least a heat-sensitive recording layer and a protective layer formed on said heat-sensitive recording layer, said protective layer comprising at least one compound represented by one of the following structural formulae (1), (2) and (3) or a water-soluble polymer having a repeating unit represented by the following structural formula (4):



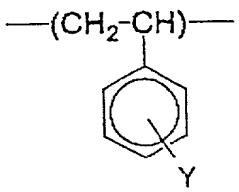
Structural formula (1)



Structural formula (2)

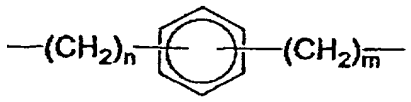


Structural formula (3)



Structural formula (4)

in which, in the structural formulae (1), (2) and (3), X represents H or CH_2OH; R^1, R^2, R^3 and R^4 each represents a saturated or unsaturated alkyl group having from 8 to 24 carbon atoms, which alkyl group is optionally branched and optionally has a hydroxyl group; R^3 and R^4 may be the same and may be different; and L represents the following structural formula (5):



Structural formula (5)

in which n+m is an integer from 0 to 8, and, in the structural formula (4), Y represents H, $-SO_3A$ or -COOA, and A represents Na, K, NH_4 or $NH(C_2H_4OH)_3$.

2. A heat-sensitive recording material as claimed in claim 1, wherein said at least one compound represented by one of the structural formulae (1), (2) and (3) is contained in said protective layer in an amount of from 0.5 to 10% by weight based on total dry coating amount of said protective layer.

3. A heat-sensitive recording material as claimed in claim 1, wherein said at least one compound represented by one of the structural formulae (1), (2) and (3) is selected from

the group consisting of stearic amide, ethylene bisstearoamide, methylol stearoamide, lauric amide, ethylene bislaurilamide, myristic amide, palmitic amide and behenic amide.

4. A heat-sensitive recording material as claimed in claim 1, wherein said protective layer contains stearic amide in an amount of from 0.5 to 10% by weight based on total dry coating amount of said protective layer.

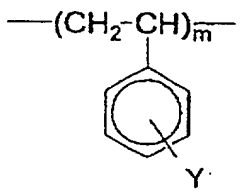
5. A heat-sensitive recording material as claimed in claim 1, wherein said support and said heat-sensitive recording layer are substantially transparent.

6. A heat-sensitive recording material as claimed in claim 1, wherein a thermal head is placed in contact with said heat-sensitive recording material during image recording, and a difference in transportation torque when applying a minimum amount of energy for causing coloring in said heat-sensitive recording material and when applying an amount of energy for causing an optical transmission density of approximately 3.0 is no more than 2 Kg·cm.

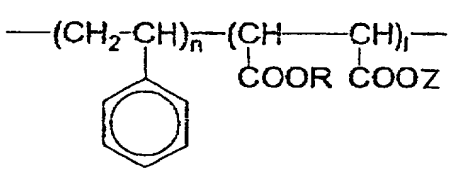
7. A heat-sensitive recording material as claimed in claim 6, wherein said protective layer comprises said

water-soluble polymer having a repeating unit represented by the structural formula (4).

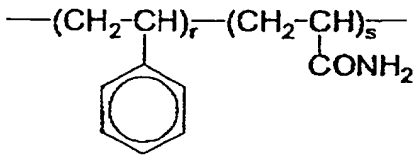
8. A heat-sensitive recording material as claimed in claim 7, wherein said water-soluble polymer comprises at least a water-soluble polymer represented by one of the following structural formulae (6), (7), (8) and (9):



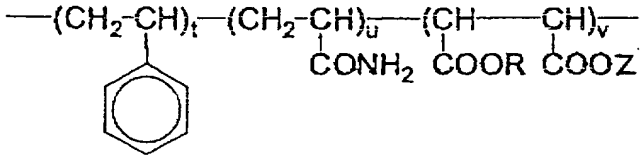
Structural formula (6)



Structural formula (7)



Structural formula (8)



Structural formula (9)

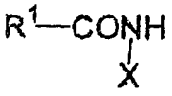
in which Y represents $-SO_3A$ or -COOA, and A represents Na, K, NH_4 or $NH(C_2H_4OH)_3$; m represents an integer of at least 10; n

represents a number from 0.1 to 0.9, l represents a number from 0.9 to 0.1, and n + l is 1.0; r represents a number from 0.1 to 0.9, s represents a number from 0.9 to 0.1, and r + s is 1.0; t represents a number from 0.1 to 0.9, u represents a number from 0.1 to 9, v represents a number from 0.1 to 0.9, and t + u + v is 1.0; R represents an alkyl group having 2 or more carbon atoms; and Z represents Na, K, NH_4 or $NH(C_2H_4OH)_3$.

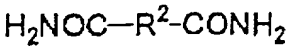
9. A heat-sensitive recording material as claimed in claim 6, wherein said protective layer contains said water-soluble polymer in an amount of from 1 to 10% by weight based on total dry coating amount of said protective layer.

10. A heat-sensitive recording process comprising the steps of:

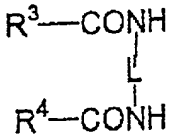
(a) preparing a heat-sensitive recording material comprising a support and a plurality of layers formed on the support, said plurality of layers including at least a heat-sensitive recording layer and a protective layer formed on said heat-sensitive recording layer, said protective layer comprising at least one compound represented by one of the following structural formulae (1), (2) and (3) or a water-soluble polymer having a repeating unit represented by the following structural formula (4):



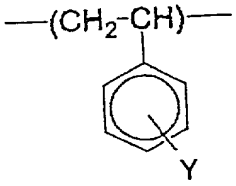
Structural formula (1)



Structural formula (2)

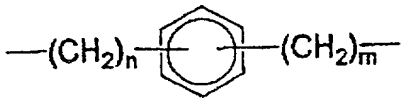


Structural formula (3)



Structural formula (4)

in which, in the structural formulae (1), (2) and (3), X represents H or CH_2OH; R^1, R^2, R^3 and R^4 each represents a saturated or unsaturated alkyl group having from 8 to 24 carbon atoms, which alkyl group is optionally branched and optionally has a hydroxyl group; R^3 and R^4 may be the same and may be different; and L represents the following structural formula (5):



Structural formula (5)

in which n+m is an integer from 0 to 8, and, in the structural formula (4), Y represents H, $-SO_3A$ or -COOA, and A represents Na, K, NH_4 or $NH(C_2H_4OH)_3$; and

(b) subjecting said heat-sensitive recording material to heat using a thermal head which has an uppermost layer having a carbon content of at least 90%.